



Wind Monitoring Equipment

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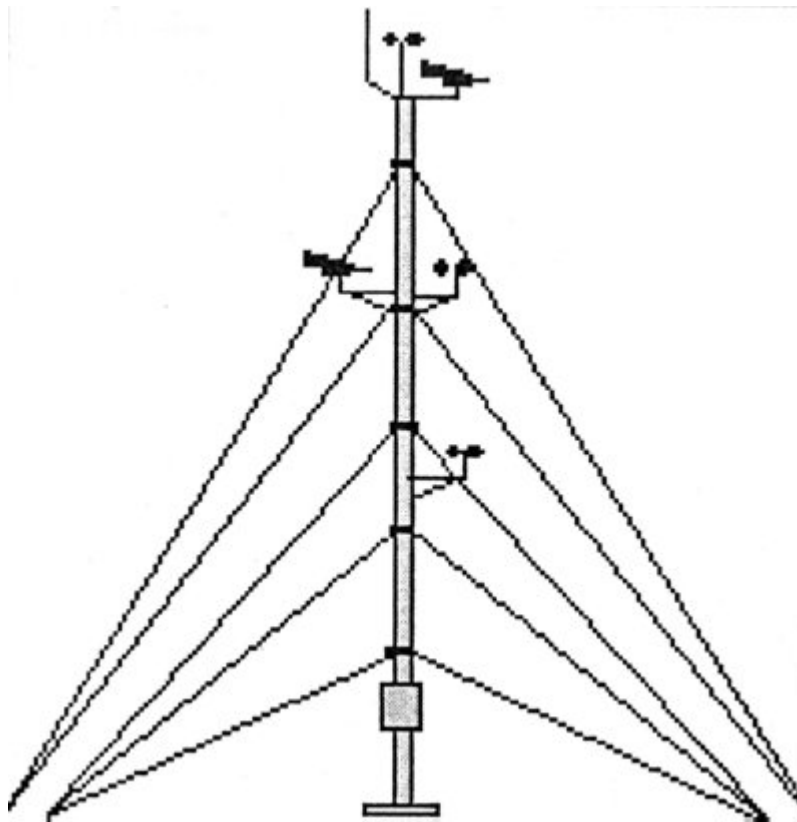
- What do we monitor?
 - Wind speed (average and gusts)
 - Wind Direction
 - Temperature
- How often do we record it?
 - Every 10 minutes is best
 - Hourly is sometimes the most practical
- For how long?
 - 2 years is good
 - 1 year is a minimum



Wind Monitoring Equipment

- Sensors (Speed, Direction, Temperature)
- Data Loggers
- Towers

Tower with Logger and Sensors





Anemometer & Wind Vane



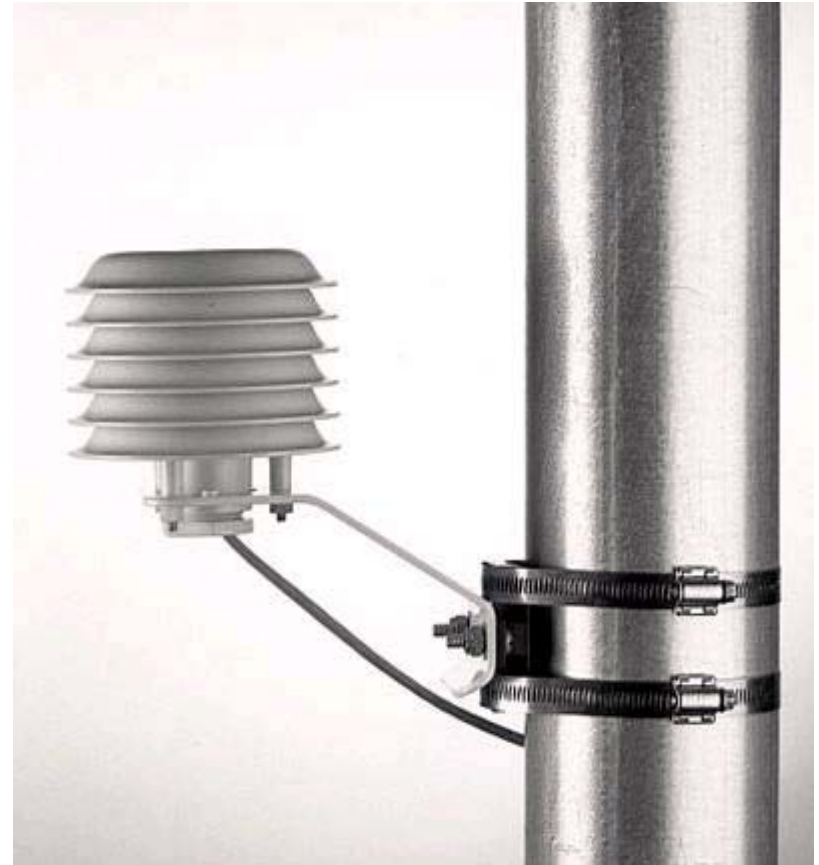
Standard anemometer \$97

Calibrated anemometer \$225

Heated anemometers and vanes for very cold climates \$970 each!

Temperature Sensor

- \$195
- Helps determine periods of icing





Other Sensors

- Barometric Pressure
- Relative Humidity
- Solar Radiation
- Probably not essential for wind resource assessment



NRG Wind Explorer



- 1 anemometer, 1 wind vane, 1 analog channel
- Stores data on 128KB DataPlugs (\$60)
- Cheap (\$600)



NRG 9300 Cell Logger



- Up to 6 anemometers
- Up to 6 wind vanes or other analog sensors
- Stores data on FLASH memory cards
- \$1700 to \$2700



NRG Symphonie Logger



- Internet-enabled – data arrive by email
- Flexible configuration
- \$1250 plus add-ons

SecondWind Nomad Logger



- Up to 3 anemometers
- Up to 4 wind vanes
- Internal memory or memory cards
- about \$1300

Campbell Scientific Logger



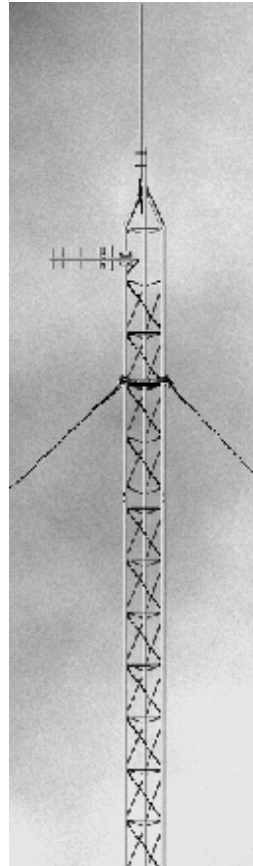
- 6 different models
- Good for wind turbine monitoring



Towers

- Tubular
 - Most common for wind evaluation
 - Tilt-up
 - Up to 50m
- Lattice
 - Existing communications towers
- Booms hold sensors away from tower

Lattice Towers





Tubular Towers



Tilting up a 14m tower in Ulaanbaatar, Mongolia



Wind Monitoring Equipment Manufacturers

NRG Systems, Inc.
110 Commerce St.
P.O. Box 509
Hinesburg, VT 05461
802-482-2255
802-482-2272 fax
<http://nrgsystems.com/>
email: sales@nrgsystems.com

Second Wind Inc.
366 Summer Street
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617-776-0391 fax
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Wind Monitoring Equipment Manufacturers (cont.)

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Logan, Utah 84321-1784

Phone: 435.753.2342

Fax: 435.750.9540

Email: info@campbellsci.com

Web: <http://www.campbellsci.com>



Examples of Less-than-ideal Measurement Equipment and Sites



Plate-type ‘anemometers’ in Mongolia





A sheltered city meteorological station, Ulaanbaatar, Mongolia

